

REMARKS

This paper is being provided in response to the September 6, 2006 Office Action for the above-referenced application. In this response, Applicants have made minor modifications to the specification and amended claims 1, 5, 7, 9 and 10-18 to clarify that which Applicants consider to be the invention. Applicants respectfully submit that the changes to the specification do not add new matter and the amendments to the claims are supported by the originally-filed application. See, for example, the originally-filed specification at page 17, lines 13-15 and the discussion beginning at the bottom of page 49.

The rejection of claims 11-18 under 35 U.S.C. 101 has been addressed by amendments to the claims provided herein in accordance with the guidelines set forth in the Office Action. Accordingly, Applicants respectfully request that this rejection be withdrawn.

The rejection of claims 1-2 and 5-18 under 35 U.S.C 103(a) as being unpatentable over US patent number 5,469,453 to Gilder (hereinafter "Gilder") in view of US patent number 6,970,987 to Ji (hereinafter "Ji") is hereby traversed and reconsideration thereof is respectfully requested in view of amendments to the claims contained herein.

Claim 1, as amended herein, recites a method of recovering data provided by a plurality of primary storage devices to a plurality of secondary storage devices. The method includes the secondary storage devices receiving data in chunks, each chunk having a sequence number associated therewith, where writes by the primary storage devices begun before a particular time are assigned a first sequence number and writes begun by the primary storage devices begun

after the particular time are assigned a second sequence number different than the first sequence number and where switching of sequence numbers is coordinated between the primary storage devices. The method also includes, for each of the secondary storage devices, discarding data corresponding to chunks for which all data thereof has not been received and, for each of the secondary storage devices, restoring a chunk of data thereto where all of the chunks of data restored to the plurality of secondary storage devices have the same sequence number. Claims 2 and claims 5-10 depend from claim 1.

Claim 11, as amended herein, recites a computer-readable medium containing computer software that recovers data provided by a plurality of primary storage devices to a plurality of secondary storage devices. The computer-readable medium includes executable code that receives data in chunks, each chunk having a sequence number associated therewith, where writes by the primary storage devices begun before a particular time are assigned a first sequence number and writes begun by the primary storage devices begun after the particular time are assigned a second sequence number different than the first sequence number and where switching of sequence numbers is coordinated between the primary storage devices, executable code that discards data corresponding to chunks for which all data thereof has not been received for each of the secondary storage devices, and executable code that restores a chunk of data thereto for each of the secondary storage devices, where all of the chunks of data restored to the plurality of secondary storage devices have the same sequence number. Claims 12-18 depend from claim 11.

Gilder discloses detecting and correcting various data errors that may arise in a mass data storage apparatus comprising a set of physical mass storage devices operating as one or more larger logical mass storage devices. Gilder discloses detecting and reconstructing incorrectly routed data, detecting when one or more physical devices fails to write a block of data, and discloses reconstructing lost data. As set forth in the Office Action, Gilder does not disclose transmission originating from multiple primary storage devices.

Ji discloses redundantly storing data in a geographically-diverse data-storing system having one or more data sites and a set of data-protecting sites. A new version of a set of data is written to a first data site, and a representation of the new version is generated. The representation is transmitted from the first data site to a subset of the data-protecting sites. At each data-protecting site, the representation is stored and an acknowledgment of the storing is transmitted back. Upon receipt back of a commit command, a data-protecting operation is performed on the representation to generate a data-protecting value, which is also stored. Then, storage corresponding to the representation is released. Further, at a first data site, once acknowledgments from each data-protecting site are received, a commit command is transmitted to the subset of data-protecting sites. Additionally, storage is released corresponding to a previous version of the set of data. Column 4, lines 10-14 of Ji disclose that each data site of the present data-storage system may contain disks, servers, a LAN, and some local redundancy such as a hardware RAID-5 system. Ji also discloses that each site is assumed to employ a storage-area network (SAN) and that, to ensure the recoverability of data on a data site, the corresponding data-protecting site that protects the data must be located separate and apart from the data site, such that if the entire data site fails, the redundant information remains intact.

Applicants respectfully submit that neither Gilder, nor Ji, nor any combination thereof show, teach, or suggest a feature of the present claimed invention where writes by the primary storage devices begun before a particular time are assigned a first sequence number and writes begun by the primary storage devices begun after the particular time are assigned a second sequence number different than the first sequence number and where switching of sequence numbers is coordinated between the primary storage devices. As indicated on page 3 of the Office Action, Gilder does not disclose transmissions originating from multiple primary storage devices. In addition, although Ji does disclose data being transferred from one RAID site to another, Ji still does not teach assigning sequence numbers to writes and also does not teach coordinating switching of sequence numbers between the primary storage devices as set forth in Applicants' independent claims 1 and 10. The desirability and utility of claimed features such as assigning sequence numbers and coordinating sequence number switches is set forth in the application. See, for example, the discussion beginning at line 4 on page 49. Neither Gilder, nor Ji, nor any combination thereof show, teach, or suggest these features. Accordingly, Applicants respectfully request that this rejection be withdrawn.

The rejection of claim 3 under 35 U.S.C 103(a) as being unpatentable over Gilder in view of Ji and further in view of U.S. patent number 6,088,694 to Burns (hereinafter "Burns") is hereby traversed and reconsideration thereof is respectfully requested.

Claim 3 depends from claim 1, discussed above.

The Gilder and Ji references are discussed above.

As set forth in the Office Action, Burns teaches a database system employing delta versioning and backing up of files where backup storage is stored proximate to the data being backed up.

Applicant respectfully submits that the deficiencies of Gilder and Ji with respect to claim 1, discussed above, are not overcome by the addition of the Burns reference. Accordingly, Applicant respectfully requests that this rejection be withdrawn.

The rejection of claim 4 under 35 U.S.C 103(a) as being unpatentable over Gilder in view of Ji and further in view of U.S. patent number 5,086,502 to Malcolm (hereinafter “Malcolm”) is hereby traversed and reconsideration thereof is respectfully requested.

Claim 4 depends from claim 1, discussed above.

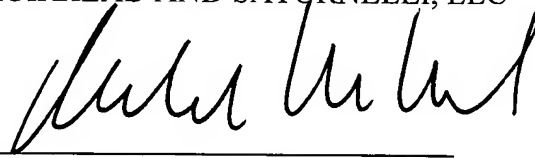
The Gilder and Ji references are discussed above.

As set forth in the Office Action, Malcolm teaches a system that stores a backup copy of write operations being performed on a storage device.

Applicant respectfully submits that the deficiencies of Gilder and Ji with respect to claim 1, discussed above, are not overcome by the addition of the Malcolm reference. Accordingly, Applicant respectfully requests that this rejection be withdrawn.

Based on the above, Applicants respectfully request that the Examiner reconsider and withdraw all outstanding rejections and objections. Favorable consideration and allowance are earnestly solicited. Should there be any questions after reviewing this paper, the Examiner is invited to contact the undersigned at 508-898-8603.

Respectfully submitted,
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